"RESPONSE UNDER 37 CFR 1.116-
EXPEDITED PROCEDURE EXAMINING
GROUP 2625"

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claim 1 (Canceled).

Claim 2 (Currently Amended): A parameter determination method of a template matching searching from a second image a matching area having the highest correlation with a template including a reference point in a first image, method comprising:

calculating, based on the first image, a difference between a corresponding point in the second image corresponding to the reference point and a calculated point in the second image which is obtained by the template matching; and

determining, based on the difference, at least one of parameters of the template matching, the parameters comprising a location of the reference point, a size of the template and resolutions of the first and second images; ~~The method according to claim 1,~~

wherein the difference comprises an upper bound of average distance between the corresponding point and the calculated point.

Claims 3-7 (Canceled).

Claim 8 (Currently Amended): An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein, the computer readable program searching from a second image a matching area having the highest correlation with a template including a reference point in a first, the computer readable program code means comprising:

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computer readable program code means for causing a computer to calculate, based on the first image, a difference between a corresponding point in the second image corresponding to the reference point a calculated point in the second image which is obtained by template matching; and

computer readable program code means for causing a computer to determine, based on the difference, at least one of parameters of the template matching, the parameters comprising a location of the reference point, a size of the template and resolutions of the first and second images; ~~An article of manufacture according to claim 7,~~

wherein the difference comprises an upper bound of average distance between the corresponding point and the calculated point.

Claims 9-13 (Canceled).

Claim 14 (Currently Amended): An image processing device for searching from a second image a matching area having the highest correlation with a template including a reference point in a first image, comprising:

a calculation unit configured, based on the first I mage, to calculate a difference between a corresponding point in the second image corresponding to the reference point and a calculated point which is obtained by template matching; and

a determination unit configured to determine, based on the difference, at least one of parameters of the template matching, the parameters comprising a location of the reference point, a size of the template and resolutions of the first and second images; ~~The device according to claim 13,~~

wherein the difference comprises an upper bound of average distance between the corresponding point and the calculated point.

Claims 15-18 (Canceled).

19. (Previously Presented): The method according to claim 2, wherein the calculating calculates the following upper bound u:

$$u = \sum_{\mathbf{e}\in S} |\mathbf{e}| \mathrm{P}(\mathbf{e})$$

where, s is a searching range, e is an error vector, and P(e) is a probability that an error indicated by the error vector e is generated as a result of the template matching and is expressed as follows:

$$\mathrm{P}(\mathbf{e}) \le \exp\left\{-\frac{1}{2} NE_{TM}(\mathbf{e})\right\}$$

where

$$E_{TM}(\mathbf{e}) = \max_{0<\rho<1} E_{TM}(\mathbf{e}, \rho),$$

$$E_{TM}(\mathbf{e}, \rho) = R\left\{\gamma_2{}^2 \frac{\rho}{1+\rho} + \log(1-\rho^2)\right\} + (1-R)\gamma_1{}^2 \rho(1-\rho),$$

$$\gamma_1{}^2 = \frac{1}{|\mathrm{W}_1|} \sum_{\mathbf{p}\in \mathrm{W}_1} \frac{\Delta^2(\mathbf{p},\mathbf{e})}{\sigma^2}, \quad \gamma_2{}^2 = \frac{1}{|\mathrm{W}_2|} \sum_{\mathbf{p}\in \mathrm{W}_2} \frac{\Delta^2(\mathbf{p},\mathbf{e})}{\sigma^2}$$

where $W_1 = W(O) \cap W(e)$, $W_2 = W^c(O) \cap W(e)$, and $W_3 = W(O) \cap W^c(e)$,

$W^c$ represents complement of W,

W(O) is a template having the corresponding point as the center, and

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W(e) is an area displaced by the error vector e.

20. (Previously Presented): The method according to claim 7, wherein the calculating calculates the following upper bound u:

$$u = \sum_{\mathbf{e}\in S} |\mathbf{e}| \mathrm{P}(\mathbf{e})$$

where, s is a searching range, e is an error vector, and P(e) is a probability that an error indicated by the error vector e is generated as a result of the template matching and is expressed as follows:

$$\mathrm{P}(\mathbf{e}) \le \exp\left\{-\frac{1}{2} NE_{TM}(\mathbf{e})\right\}$$

where

$$E_{TM}(\mathbf{e}) = \max_{0<\rho<1} E_{TM}(\mathbf{e}, \rho),$$

$$E_{TM}(\mathbf{e}, \rho) = R\left\{\gamma_2{}^2 \frac{\rho}{1+\rho} + \log(1-\rho^2)\right\} + (1-R)\gamma_1{}^2 \rho(1-\rho),$$

$$\gamma_1{}^2 = \frac{1}{|\mathrm{W}_1|} \sum_{\mathbf{p}\in \mathrm{W}_1} \frac{\Delta^2(\mathbf{p},\mathbf{e})}{\sigma^2}, \quad \gamma_2{}^2 = \frac{1}{|\mathrm{W}_2|} \sum_{\mathbf{p}\in \mathrm{W}_2} \frac{\Delta^2(\mathbf{p},\mathbf{e})}{\sigma^2}$$

where $\mathrm{W}_1 = \mathrm{W}(\mathrm{O}) \cap \mathrm{W}(\mathrm{e})$, $\mathrm{W}_2 = \mathrm{W}^{\mathrm{c}}(\mathrm{O}) \cap \mathrm{W}(\mathrm{e})$, and $\mathrm{W}_3 = \mathrm{W}(\mathrm{O}) \cap \mathrm{W}^{\mathrm{c}}(\mathrm{e})$,

$\mathrm{W}^{\mathrm{c}}$ represents complement of W,

W(O) is a template having the corresponding point as the center, and

W(e) is an area displaced by the error vector e.

21. (Previously Presented): The method according to claim 13, wherein the calculating calculates the following upper bound u:

$$u = \sum_{\mathbf{e}\in S} |\mathbf{e}| P(\mathbf{e})$$

where, s is a searching range, e is an error vector, and P(e) is a probability that an error indicated by the error vector e is generated as a result of the template matching and is expressed as follows:

$$P(\mathbf{e}) \le \exp\left\{-\frac{1}{2} NE_{TM}(\mathbf{e})\right\}$$

where

$$E_{TM}(\mathbf{e}) = \max_{0<\rho<1} E_{TM}(\mathbf{e},\rho),$$

$$E_{TM}(\mathbf{e},\rho) = R\left\{\gamma_2{}^2 \frac{\rho}{1+\rho} + \log(1-\rho^2)\right\} + (1-R)\gamma_1{}^2 \rho(1-\rho),$$

$$\gamma_1{}^2 = \frac{1}{|W_1|}\sum_{\mathbf{p}\in W_1} \frac{\Delta^2(\mathbf{p},\mathbf{e})}{\sigma^2}, \quad \gamma_2{}^2 = \frac{1}{|W_2|}\sum_{\mathbf{p}\in W_2} \frac{\Delta^2(\mathbf{p},\mathbf{e})}{\sigma^2}$$

where $W_1 = W(O) \cap W(e)$, $W_2 = W^c(O) \cap W(e)$, and $W_3 = W(O) \cap W^c(e)$,

$W^c$ represents complement of W,

W(O) is a template having the corresponding point as the center, and

W(e) is an area displaced by the error vector e.